

Christina Swanson, Ph.D.

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Curriculum Vitae

EDUCATION

Ph.D., Biology, University of California, Los Angeles, 1991

Dissertation Title: Aspects of the physiology of salinity adaptation in the milkfish, *Chanos chanos* Forskal, during two life history stages

B.A., Biology, Cornell University (with distinction in all subjects), 1980

PROFESSIONAL EXPERIENCE

Executive Director

The Bay Institute of San Francisco, Novato, California, 2008 to present

- Directed administrative, financial, development, programmatic, advocacy, staff development functions of the organization (17 staff; \$1.8-2 million annual budget)
- Developed policy and long-term strategic planning for the organization, including broad environmental positions and programs, and administrative, communication, development and financial policies
- Lead effort to preserve the functional and programmatic integrity of the organization during severe economic downturn in 2008-2009
- Lead successful campaign to acquire the Aquarium of the Bay, including building public and institutional support, developing comprehensive business plan for the project, and representing the campaign to funders and supporters
- Represented and served as principal spokesperson for the organization
- Built and supported partnerships among governmental agencies, non-governmental organizations, communities, land owners, schools and academic institutions to conduct and/or support conservation-related work in support of the organization's mission and goals
- Provided policy and technical expertise to colleague organizations, policy makers, and the public
- Wrote and directed preparation of proposals that raised more than \$12 million in grants, loans and bond financing for the organization, Aquarium campaign, and collaborating organizations in 2008-2009

Senior Scientist/Fisheries Scientist

The Bay Institute of San Francisco, Novato, California, 1999-2008

- Conducted applied research and integrated analysis of environmental, hydrologic, biological, and management conditions in the San Francisco Bay, Sacramento-San Joaquin Delta, Sacramento-San Joaquin Watershed, and San Joaquin Valley

- Participated in development, review and revision of international, federal, state, and local environmental monitoring, regulation and resource management policies and plans (e.g., North American Marine Protected Areas Network, Commission for Environmental Cooperation; National Estuary Program; State Water Resources Control Board water quality standards; CALFED Bay-Delta Program Ecosystem Restoration Program)
- Collaborated with federal, state and local agency scientists, resource managers and policy makers; university scientists and students; scientists and planners from non-governmental organizations; consultants; and representatives of stakeholder communities on a variety of scientific research, environmental management and planning, and policy review projects
- Represented and provided scientific and technical expertise to environmental and fishing non-governmental organizations
- Provided expert testimony in federal court for cases involving endangered species, critical habitat and water resource management
- Provided guest lectures and seminars on California water policy (CSU Fresno) and ecological indicators (Jasper Ridge Biological Preserve, Stanford University)
- Advised and mentored students, young professionals, organizations, and environmental education programs
- Developed and wrote public outreach reports and technical memoranda
- Communicated with the public and media about issues and conditions in local, state, and national environmental and resource management
- Contributed to grant proposals and reports that raised more than \$1 million for The Bay Institute and collaborating organizations

Visiting Post-doctoral Researcher

*Department of Wildlife, Fish, and Conservation Biology,
University of California, Davis, 1999-2005*

- Managed (with P. S. Young) large, multi-department and multi-agency, collaborative research program on fish physiology and behavior, hydraulics and bioengineering (UC Davis Department of Civil and Environmental Engineering, California Departments of Fish and Game and Water Resources, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, and NOAA Fisheries)
- Conducted research on applied physiology and behavior of fishes in artificial flow regimes near water diversions
- Wrote grant proposals that secured more than \$2,100,000 to support research and student involvement in research
- Trained and supervised student and staff research assistants
- Wrote scientific journal articles and technical reports
- Guest lectured in departmental courses and seminars
- Advised and mentored undergraduate- and graduate-level students and post-graduate research assistants

Lecturer

Department of Wildlife, Fish, and Conservation Biology, University of California, Davis, 2000

- Developed and taught upper division course, Physiological Ecology of Wildlife
- Advised and mentored undergraduate- and graduate-level students

Post-doctoral Research Scientist

*Department of Wildlife, Fish, and Conservation Biology,
University of California, Davis, 1991-1999*

- Conducted research on applied physiology, ecology and behavior of fishes
- Collaborated with scientists from other UC Davis departments (Animal Science, School of Veterinary Medicine)
- Wrote grant proposals that secured more than \$400,000 to support research and student involvement in research
- Trained and supervised student, post-graduate and staff research assistants
- Wrote scientific journal articles and technical reports
- Guest lectured in departmental courses and seminars
- Advised and mentored undergraduate- and graduate-level students and post-graduate research assistants
- Mentored high school-level student interns sponsored by the National Science Foundation's Young Scholars Program

Research Assistant

University of California, Los Angeles, 1990-1991.

- Conducted research on effects of acid deposition on early development of high elevation amphibian species

Fulbright Scholar

Philippines, 1988-1989

- Conducted applied research on physiology and behavior of milkfish, and milkfish aquaculture techniques
- Provided guest lectures at University of the Philippines and Southeast Asian Fisheries Development Center (SEAFDEC)

Research Assistant

Oceanic Institute, Makapuu Point, Hawaii, 1987-1989.

- Conducted applied research on aquaculture, reproduction, and early life history of milkfish and striped mullet

Teaching Fellow/Teaching Assistant

University of California, Los Angeles, 1983-1986, 1990.

- Lectured, conducted laboratory and discussion sessions, and supervised students in several upper and lower division biology and marine ecology courses (Introductory Biology, Introductory Biology Laboratory, and Ecological Physiology of Marine Vertebrates)
- Advised and mentored undergraduate- and graduate-level students

Science Curriculum Consultant

Redwood City School District (San Mateo County) and Jefferson School District (San Benito County), California, 1986, 1987

- Developed curricula for an activity-based science program targeting second language learners (Finding Out/Descubrimiento)
- Conducted in-service science education workshops for teachers

Laboratory Director/Marine Science Instructor/Maritime History Instructor

Orange County Marine Institute, Dana Point, CA, 1981-1983

- Developed, organized, and taught field and laboratory programs in marine and coastal biology and ecology, and maritime history (grades: K-college)
- Managed facility laboratory and classroom exhibits

PROFESSIONAL LEADERSHIP in SCIENCE and POLICY

Development of Environmental Regulations and Policy

- **Long-term Planning for the Delta.** Participated in and prepared technical and policy review of ecosystem restoration and water management plans for the Governor's Delta Vision Panel and the Bay Delta Conservation Plan for the Sacramento-San Joaquin Delta (2006 to present).
- **Water Quality Standards** for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary. Prepared and presented technical and policy reviews and suggested revisions for the State Water Resources Control Board's 1995 Water Quality Control Plan (2004-2006).
- **Environmental Water Account.** Participated in the development of the CALFED Bay-Delta Program's Environmental Water Account (1999-2000), prepared two technical and policy review reports on implementation and effectiveness of EWA (2001, 2002), and provided technical and policy comments to federal and state implementing agencies and to the independent EWA Review Panel (2001-2006).
- **Endangered Species Act.** Member of the Central Valley Technical Recovery Team, a group of scientists convened by NOAA Fisheries to evaluate population status and begin recovery planning for Endangered Species Act-listed Central Valley salmon species (2003 to present). Prepared petitions to federal and state governments for listing and/or increased protection of listed species in the Sacramento-San Joaquin Watershed (2005-2006).
- **Bioengineering and Fish Screen Regulatory Criteria.** Applied results of multi-disciplinary research to develop and refine regulatory criteria for fish screen design and water diversion operation (2000-2003). Member of the Central Valley Fish Facilities Review Team, the interagency project workteam charged with technical, policy review and oversight of fish facilities (i.e., fish screen, ladders, and dams) in the Sacramento-San Joaquin Watershed and Delta (2000 to present).

Environmental Management Planning and Implementation

- **Adaptive Management and Ecosystem Restoration.** Member of the CALFED Adaptive Management Planning Team and co-chair of “Action Team” subgroup, charged with developing conceptual models for ecosystem processes, habitats, stressors and species, and the process and tools to scientifically evaluate and prioritize proposed ecosystem restoration projects for the Delta Regional Ecosystem Restoration Implementation Program, the Bay-Delta Conservation Plan, and the recently launched, state-mandated “Delta Vision” process (2004 to present).
- **Management of California Water Project Operations.** Member of the CALFED Bay-Delta Program’s Data Assessment Team, an interagency group charged with real-time evaluation and management of water project operations in the Sacramento-San Joaquin Watershed and Delta for the protection of native inland and anadromous fishes, estuarine habitat, and water quality; Operations and Fisheries Forum, a stakeholder oversight team for evaluating and commenting on water management operations and fisheries protection actions in the Sacramento-San Joaquin Watershed and Delta; and the CALFED Operations Group, an interagency and stakeholder group for review and planning of ongoing and future water project operations (1999 to present).
- **Restoration of the San Joaquin River.** Member of the Restoration Oversight Team, comprised of representatives of the environmental coalition plaintiffs (Natural Resources Defense Council, the Bay Institute), defendants (Friant Water Users Authority) and consultants, to guide and review development of a comprehensive plan to restore the San Joaquin River and reestablish salmonid fishes in the reach from the Merced River to Friant Dam (1999-2004). Provided technical support and review for recently resolved litigation and settlement agreement over management of the river (2004-2006).

Evaluating Effectiveness of Environmental Management and Policy

- **Ecological Scorecard.** Developed (with A. Pawley, P. Vorster, and G. Bobker) and served as principal author of the San Francisco Bay Index, the first broadly accepted suite of ecological and management indicators for California’s largest estuary. Promoted and facilitated transfer of Ecological Scorecard approach and methods to other geographic regions (e.g., San Joaquin Basin), federal and state resource management agencies (e.g., CALFED Bay-Delta Program) and programs (e.g., San Francisco Estuary Project, part of the National Estuary Program), and non-governmental organizations (e.g., San Francisco Estuary Institute).
- **Water Quality and Management Response Indicators for the San Joaquin Basin.** Collaborated with San Francisco Estuary Institute, U.S. Environmental Protection Agency and San Joaquin Valley Regional Water Quality Control Board to develop indicators for salt and selenium contamination conditions and management response actions to evaluate the effectiveness of recently adopted Total Maximum Daily Load (TMDL) requirements (2005-2006).

- **Year in Water.** Developed and wrote the first comprehensive annual review of water management and the effectiveness of environmental water use for ecosystem and fishery protection and restoration for the Sacramento-San Joaquin Watershed, Delta, and San Francisco Bay (2003-2004).

Communication and Outreach

- **President**, California-Nevada Chapter of the American Fisheries Society, 2004-2005.
- **Program Chair**, 2004 Annual Meeting of the California-Nevada Chapter of the American Fisheries Society, Redding, California.
- **Editorial Board**, *Estuaries*, the monthly newsletter for the National Estuary Program's San Francisco Estuary Project (2002 to present).
- **Invited Speaker**, testified before the California State Senate Agricultural Water Resources Committee on "Sound Science: Decisions that Benefit the Environment and Water Supply" (March 2000) and State Assembly Water, Parks, and Wildlife Committee on the "Review of the Research Plan to Investigate the Pelagic Organism Decline" (August 2005) and 2009 Delta/Water legislation (August 2009).
- **Invited Speaker**, "California Water and Fisheries as a Living Laboratory for Adaptive Management: A Big Picture Perspective of a Scientist Advocate", presented at the California Water colloquium, September 2009, Berkeley, California,
- **Invited Speaker**, "Water Rights for Fish", presented at the 2006 Water Policy Conference, sponsored by Public Officials for Water and Environmental Reform (POWER), November 2006, Los Angeles, California.
- **Invited Speaker**, "Measure for Measure: Ecosystem Indicators for the San Francisco Bay", presented to the Heinz Center, March 2006, San Francisco, California.
- **Invited Speaker**, "Estuaries", presented at the Hydrokinetic and Wave Energy Technology, Technical and Environmental Issues Workshop, sponsored by the U.S. Department of Energy, October 2005, Washington DC.
- **Invited Speaker**, "Science and Adaptive Management", presented at the Water Policy and Law Conference, sponsored by the Water Education Foundation, July 2005, San Diego, California.
- **Organizing Committee**, 2007 Annual Meeting of the American Fisheries Society, San Francisco, California.
- **Organizing Committee**, 2007 State of the Estuary Conference, sponsored by the San Francisco Estuary Project.
- **Organizing Committee**, "Estuarine Portraits: Lessons Learned about Fish, Habitats, and People in Five Estuaries from Canada to Mexico", special symposium at the 2007 Annual Meeting of the American Fisheries Society (AFS), San Francisco, California

- **Symposium Chair** (with P.S. Young), “Applied Environmental Physiology of Fishes”, presented at the International Congress on the Biology of Fishes, July 1996, San Francisco, California.
- **Science Content Committee** member for development of exhibit themes and scientific content for the Bay Center, a public museum for the San Francisco Bay to be located at Fisherman’s Wharf.
- **Resource speaker** for Water Education Foundation-sponsored tours of the Sacramento-San Joaquin Delta and the San Joaquin Valley (2001 to present).
- **Mentor**, for young professionals participating in the Water Education Foundation’s “Water Leaders” program (2005).

HONORS and AWARDS

President, California-Nevada Chapter of the American Fisheries Society, 2004-2005

Distinguished Professional Achievement Award, California-Nevada Chapter of the American Fisheries Society, 2003

Graduate Woman of the Year, University of California, Los Angeles, 1991.

Fulbright Scholar, Philippines, Fulbright-Hays Dissertation Research Abroad, 1988-1989.

Phi Beta Kappa, Cornell University, 1980.

PROFESSIONAL AFFILIATIONS

American Association for the Advancement of Science

American Association of University Women

American Fisheries Society (President, California-Nevada Chapter, 2004-2005)

California Water and Environmental Modeling Forum

Union of Concerned Scientists

PUBLICATIONS

Peer-reviewed articles

- White, D. K., C. Swanson, P. S. Young, J. J. Cech, Jr., Z. Chen, and M. L. Kavvas (2007) Close encounters with a fish screen II: delta smelt behavior before and during screen contact. *Transactions of the American Fisheries Society* 136:528-538.
- Lindley, S. T., R. S. Schick, E. Mora, P. B. Adams, J. J. Anderson, S. Greene, C. Hanson, B. P. May, D. McEwan, R. B. MacFarlane, C. Swanson, and J. G. Williams (2007) Framework for assessing viability of threatened and endangered Chinook salmon and steelhead in the Sacramento-San Joaquin basin. *San Francisco Estuary and Watershed Science*. Volume 5, Issue 1, Article 4. Available at: <http://repositories.cdlib.org/jmie/sfews/vol5/iss1/art4>.
- Lindley, S. T., R. S. Schick, A. Agrawal, M. Goslin, T. E. Pearson, E. Mora, J. J. Anderson, B. P. May, S. Greene, C. Hanson, A. Low, D. McEwan, R. B. MacFarlane, C. Swanson, and J. G. Williams (2006) Historical population structure of Central Valley steelhead and alteration by dams. *San Francisco Estuary and Watershed Science*. Volume 4, Issue 1, Article 3. Available at: <http://repositories.cdlib.org/jmie/sfews/vol4/iss1/art3>.
- Swanson, C. P. S. Young, and J. J. Cech, Jr. (2005) Close encounters with a fish screen: integrating physiological and behavioral results to protect endangered species in exploited ecosystems. *Transactions of the American Fisheries Society* 134:1111-1123.
- Young, P. S., C. Swanson, and J. J. Cech, Jr. (2004) Photophase and illumination effects on the swimming performance and behavior of five California estuarine fishes. *Copeia* 2004(3):479-487.
- Swanson, C. P. S. Young, and J. J. Cech, Jr. (2004) Swimming in two-vector flows: performance and behavior of juvenile Chinook salmon near a simulated screened water diversion. *Transactions of the American Fisheries Society* 133:265-278.
- Swanson, C., D. B. Antonio, P. S. Young, J. J. Cech, Jr., and R. P. Hedrick (2002) Reduced swimming performance in delta smelt infected with *Mycobacterium* spp. *Journal of Fish Biology* 61:1012-1020.
- Swanson, C., T. Reid, P. S. Young, and J. J. Cech, Jr. (2000) Comparative environmental tolerances of threatened delta smelt (*Hypomesus transpacificus*) and introduced wakasagi (*H. nipponensis*) in an altered California estuary. *Oecologia* 123:384-390.
- Antonio, D. B., Swanson, C., Cech, J. J., Jr., Mager, R. C., Doroshov, S., and Hedrick, R. P. (2000) Prevalence of *Mycobacterium* spp. in wild and captive delta smelt. *California Fish and Game* 86:233-243.
- Swanson, C. (1998) Interactive effects of salinity on metabolic rate, activity, growth and osmoregulation in the euryhaline milkfish (*Chanos chanos*). *Journal of Experimental Biology* 201:3355-3366.

- Swanson, C., P. S. Young, and J. J. Cech, Jr. (1998) Swimming performance of delta smelt: maximum performance, and behavioral and kinematic limitations on swimming at submaximal velocities. *Journal of Experimental Biology* 201:333-345
- Swanson, C. (1996) Early development of the milkfish, *Chanos chanos*: effects of salinity on embryonic and larval metabolism, yolk absorption, and growth. *Journal of Fish Biology* 48:405-421.
- Swanson, C., R. Mager, S. I. Doroshov, and J. J. Cech, Jr. (1996) Use of salts, anesthetics, and polymers to minimize handling and transport mortality in delta smelt. *Transactions of the American Fisheries Society* 125:326-329.
- Bradford, D. F., C. Swanson, and M. S. Gordon (1994) Effects of low pH and aluminum on amphibians at high elevation in the Sierra Nevada, California. *Canadian Journal of Zoology* 72:1272-1279.
- Bradford, D. F., C. Swanson, and M. S. Gordon (1993) Effects of low pH and aluminum on two declining species of amphibians in the Sierra Nevada, California. *Journal of Herpetology* 26:369-377.
- Walsh, W. A., C. Swanson, and C.-S. Lee (1991) Combined effects of temperature and salinity on embryonic development and hatching of striped mullet, *Mugil cephalus*. *Aquaculture* 97:281-289.
- Walsh, W. A., C. Swanson, and C.-S. Lee (1991) Effects of development, temperature and salinity on metabolism in eggs and yolk sac larvae of milkfish, *Chanos chanos*. *Journal of Fish Biology* 39:115-125.
- Walsh, W. A., C. Swanson, C.-S. Lee, J. Banno, and H. Eda (1989) Oxygen consumption by eggs and larvae of striped mullet, *Mugil cephalus*, in relation to development, salinity and temperature. *Journal of Fish Biology* 35:347-358.

Books, book chapters, and proceedings

- Swanson, C. (2006) Resource concerns associated with estuaries. In *Proceedings of the Hydrokinetic and Wave Energy Technologies and Environmental Issues Workshop*, (S. S. Schwartz, ed.), pp. 45-49. October 26-28, 2005, U.S. Department of Energy and RESOLVE, Inc.: Washington, DC. (available at: http://hydropower.inel.gov/hydrokinetic_wave/pdfs/hydro_workshop_proceedings_13feb06.pdf)
- Hymanson, Z. D. Briggs, B. J. Miller, and T. Swanson (2003) Comprehensive evaluation of the EWA: evaluation framework, potential criteria and evaluation steps. In *Year Three Technical Review of the Environmental Water Account and Science Symposium on Environmental and Ecological Effects of Proposed Changes in Water Operations*, October 15-17, 2003, Sacramento, CA. (available at: http://science.calwater.ca.gov/pdf/EWA_Review_Criteria-10-10-03.pdf)

- Hayes, D. E., S. D. Mayr, M. L. Kavvas, Z. Q. Chen, E. Velagic, A. Karakas, H. Bandeh, E. C. Dogrul, J. J. Cech, Jr., C. Swanson, and P. S. Young (2000) Fish screen velocity criteria development using a screened, circular swimming channel. In *Advances in Fish Passage Technology, Engineering Design and Biological Evaluation*, (M. Odeh, ed.), pp. 137-147. American Fisheries Society: Bethesda, MD.
- Swanson, C., P. S. Young, and J. J. Cech, Jr. (1998) Swimming behavior of delta smelt in multi-vector flow regimes: applications to fish screens. In *Fish Performance Studies*, (D. MacKinlay, K. Howard, and J. J. Cech, Jr., eds.), pp. 115-119. American Fisheries Society, Physiology Section: Bethesda, MD.
- Swanson, C., P. S. Young, and D. MacKinlay (1996) *Applied Environmental Physiology of Fishes Symposium Proceedings*. International Congress on the Biology of Fishes, San Francisco State University, July 14-18, 1996. Physiology Section, American Fisheries Society, Bethesda, MD. 232 pp.
- Swanson, C., J. J. Cech, Jr., and R. Piedrahita (1996) *Mosquitofish: Biology, Culture, and Use in Mosquito Control*. University of California Mosquito Research Program and Mosquito and Vector Control Association of California. 88 pp.
- Swanson, C., P. S. Young, and J. J. Cech, Jr. (1996) Swimming studies on an estuarine fish: Are performance indices the best tool to develop flow management criteria? In *Applied Environmental Physiology of Fishes Symposium Proceedings*, (C. Swanson, P. S. Young, and D. MacKinlay, eds.), pp. 83-91. American Fisheries Society, Physiology Section: Bethesda, MD.

Newsletter Articles, Technical and Public Outreach Reports

- Swanson, C. A. Pawley, P. Vorster, and G. Bobker (2005) The Ecological Scorecard – 2005 San Francisco Bay Index. The Bay Institute, CA. 31 pp. (available at: http://bay.org/ecological_scorecard.htm)
- Swanson, C. (2004) The Year in Water 2003. The Bay Institute, CA. 36 pp. (available at: http://bay.org/ecological_scorecard.htm)
- Swanson, C., P. S. Young, J. J. Cech, Jr., M. L. Kavvas, and G. Aasen (2004) Fish treadmill-developed fish screen criteria for native Sacramento-San Joaquin watershed fishes. Final Report, Anadromous Fish Screen Program. 48 pp.
- Swanson, C. A. Pawley, P. Vorster, and G. Bobker (2003) The Ecological Scorecard – 2003 San Francisco Bay Index. The Bay Institute, CA. 102 pp. (available at: http://bay.org/ecological_scorecard.htm)
- Swanson, C. (2002) The Second Annual State of the Environmental Water Account Report. The Bay Institute, CA. 25 pp. (available at: <http://bay.org/news.htm>)

- Swanson, C., P. S. Young, S. Chun, T. Chen, T. MacColl, L. Kanemoto, and J. J. Cech, Jr. (2001) Fish treadmill-developed fish screen criteria for native Sacramento-San Joaquin watershed fishes. Part 2. Biological Studies. Final Report, CALFED Bay/Delta Restoration Program. 111 pp.
- Swanson, C. (2001) The First Annual State of the Environmental Water Account Report. The Bay Institute, CA. 33 pp. (available at: <http://bay.org/news.htm>)
- Swanson, C., P. S. Young, and J. J. Cech, Jr. (1998) Swimming performance, behavior, and physiology of Delta fishes in complex flows near a fish screen: biological studies using the fish treadmill. *Interagency Ecological Program for the Sacramento-San Joaquin Estuary Newsletter*. 11(4):38-42.
- Frink, T., C. Swanson, P. S. Young, B. Fujimura, S. Mayr, J. J. Cech, Jr., and M. L. Kavvas (1998) UC Davis fish treadmill investigations update. *Interagency Ecological Program for the Sacramento-San Joaquin Estuary Newsletter*. 11(4):37-38.
- Swanson, C., P. S. Young, and J. J. Cech, Jr. (1998) Performance, behavior, and physiological responses of Delta fishes in two-vector flows in a fish treadmill. Part 3. Biological studies using the fish treadmill. Final Report, California Department of Water Resources. 59 pp.
- Swanson, C., P. S. Young, and J. J. Cech, Jr. (1998) Performance, behavior, and physiological responses of Delta fishes in two-vector flows in a fish treadmill. Part 4. Quality assurance project plan. Final Report, California Department of Water Resources. 160 pp.
- Swanson, C., P. S. Young, and J. J. Cech, Jr. (1997) Swimming performance and behavior of delta smelt: maximum velocities, endurance, and kinematics in a laminar flow swimming flume. Final Report, California Department of Water Resources. 67 pp.
- Swanson, C., P. S. Young, and J. J. Cech, Jr. (1996) Swimming performance of delta smelt. *Interagency Ecological Program for the Sacramento-San Joaquin Estuary Newsletter*. 9(3):23-25.
- Young, P. S., C. Swanson, and J. J. Cech, Jr. (1996) Can delta smelt swim in the dark? *Interagency Ecological Program for the Sacramento-San Joaquin Estuary Newsletter*. 9(3):22-23.
- Swanson, C. and J. J. Cech, Jr. (1995) Temperature and salinity tolerances of the delta smelt. *Interagency Ecological Program for the Sacramento-San Joaquin Estuary Newsletter*. 8(4):27-29.
- Swanson, C. and J. J. Cech, Jr. (1995) Environmental tolerances and requirements of the delta smelt, *Hypomesus transpacificus*. Final Report, California Department of Water Resources. 71 pp.
- Swanson, C. (1993) Tough times for the delta smelt. *Tideline* 13:1-3. U. S. Fish and Wildlife Service, San Francisco Bay National Wildlife Refuge, Newark, CA.

Abstracts and Presentations

Swanson, C. (2009) California Water and Fisheries as a Living Laboratory for Adaptive Management: A Big Picture Perspective from a Scientist Advocate. California Water Colloquium, September 8, 2009, Berkeley, CA.

Swanson, C. (2009) Delta Habitat: Can a Healthy Delta Habitat Be Restored? Annual League Day, League of Women Voters of the Bay Area, "Water: California's New Gold", January 31, 2009, Oakland, CA.

Swanson, C. (2009) Bay-Delta Water Policy and Emerging Science: Potential Changes at NMFS, USFWS, and Reclamation. California Water Law Symposium V, "Navigating the Labyrinth: Managing Conflict in the Bay-Delta", January 31, 2009, San Francisco, CA.

Swanson, C. (2008) Are We There Yet? Developing Performance Targets for Ecosystem Restoration and Fish Recovery. Annual Meeting of the California-Nevada Chapter of the American Fisheries Society, April 3-5, Lake Tahoe, CA.

Swanson, C., B. Herbold and S. Siegel (2008) Plotting the Course for Ecosystem Restoration in the Sacramento-San Joaquin Delta: Science-based Tools for Evaluating and Prioritizing Restoration Actions in a Changing Landscape. Annual Meeting of the California-Nevada Chapter of the American Fisheries Society, April 3-5, Lake Tahoe, CA.

Swanson, C. (2008) Living in Interesting Times: New Challenges for Salmon in the Delta. Annual Meeting, Salmonid Restoration Federation, March 5-8, 2008, Lodi, CA. (invited presentation)

Swanson, C., B. Herbold and S. Siegel (2008) "Envisioning Futures" for habitat restoration and salmon protection in the Delta. Annual Meeting, Salmonid Restoration Federation, March 5-8, 2008, Lodi, CA.

Swanson, C. and A. Pawley (2007) The 2007 Bay Fish Index: A Multi-metric Index to Evaluate the Health of the San Francisco Bay Fish Community. 8th Biennial State of the Estuary Conference, October 16-18, 2007, Oakland, CA.

Swanson, C., P. Vorster, and G. Bobker (2007) The 2007 Delta Flow Index: A Multi-metric Index to Evaluate Flow Conditions in the Sacramento-San Joaquin Delta. 8th Biennial State of the Estuary Conference, October 16-18, 2007, Oakland, CA.

Swanson, C. (2007) Painting New Pictures: Applying Today's Lessons to Fish, Habitats, and People in 21st Century Estuaries. Annual Meeting, American Fisheries Society, September 3-6, 2007, San Francisco, CA. (invited presentation)

Swanson, C., A. Pawley, and P. Vorster (2007) Are We There Yet? Measuring Performance of a Large-scale Ecosystem Protection and Water Management Effort in California's San Francisco Bay-Delta Estuary. Annual Meeting, American Fisheries Society, September 3-6, 2007, San Francisco, CA

- Swanson, C., A. Pawley, P. Vorster, and G. Bobker (2007) Developing the San Francisco Bay Ecological Scorecard: Lessons Learned and Possible Future Directions. Monitoring Workshop for the Gulf of California Ecoregion, Commission for Environmental Cooperation, Biodiversity Conservation Program and the North American Marine Protected Areas Network, March 26-28, 2007, La Paz, Baja California Sud, Mexico.
- Swanson, C., B. Herbold, and S. Siegel (2006) Plotting the course for delta ecosystem restoration: evaluating and prioritizing restoration actions in a changing landscape. 2006 CALFED Science Conference, Oct. 23-25, 2006, Sacramento, CA.
- Swanson, C., A. Pawley, P. Vorster and G. Bobker (2006) Measure for measure: Using an ecological scorecard to integrate information, evaluate ecosystem conditions, and improve public understanding and outreach. California and the World Ocean '06 Conference, October 17-20, 2006, Long Beach, CA.
- Swanson, C., A. Pawley, P. Vorster, and G. Bobker (2006) Measure for measure: development of an ecological scorecard to track and evaluate the health of the San Francisco Bay Estuary. Annual Meeting, American Fisheries Society, September 10-14, 2006, Lake Placid, NY.
- Swanson, C. and A. Pawley (2006) Assessing Chinook salmon population status using a multi-metric index. Pacific Salmonid Recovery Conference, February 15-17, 2006, Seattle, WA.
- Swanson, C. (2005) Estuaries. Hydrokinetic and Wave Energy Technology, Technical and Environmental Issues Workshop, Sponsored by the U.S. Department of Energy, October 26-28, 2005, Washington, DC.
- Swanson, C. and A. Pawley (2005) Using a multi-metric index to assess Chinook salmon population status. Annual Meeting of the California-Nevada Chapter of the American Fisheries Society, March 17-19, 2005, Sacramento, CA.
- Swanson, C., S. N. Chun, L.T. Kanemoto, A. Kawabata, T. MacColl, P. S. Young, J. J. Cech, Jr., and D. B. Odenweller (2004) Integrating multiple datasets to estimate entrainment loss of fishes. CALFED Science Conference, October 4-6, 2004, Sacramento, CA.
- Swanson, C., A. Pawley, P. Vorster, and G. Bobker (2004) Fish and fish communities as indicators of ecosystem health: a chapter in the Ecological Scorecard for San Francisco Bay. Annual Meeting, American Fisheries Society, August 22-24, 2004, Madison, WI.
- Swanson, C., P. S. Young, J. J. Cech, Jr. (2004) Close encounters with a fish screen: use of physiological and behavioral responses to develop regulatory criteria to protect endangered species. Annual Meeting, American Fisheries Society, August 22-24, 2004, Madison, WI.
- Swanson, C., P. S. Young, J. J. Cech, Jr., R. Wantuck, and D. Odenweller (2003) Performance and behavior of juvenile Chinook salmon near a fish screen: linking laboratory and field studies. 2003. Annual Meeting, American Fisheries Society, Western Division, April 15-17, 2003. San Diego, CA.

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- Swanson, C. and J. J. Cech, Jr. (1995) Habitat requirements and management guidelines for the delta smelt. American Fisheries Society, California-Nevada Chapter, Annual Meeting, Napa, CA, February 2-4, 1995.
- Swanson, C. and J. J. Cech, Jr. (1994) Use of physiological studies to assess habitat requirements and management guidelines for a threatened estuarine fish, the delta smelt. Western Society of Naturalists, Annual Meeting, Monterey, CA, December 27-30, 1994.
- Swanson, C. and J. J. Cech, Jr. (1994) Physiological assessments of habitat requirements of a threatened fish. Symposium on Ecological Physiology of Endangered Animals: Physiological Contributions to the Preservation of Biological Diversity, American Physiological Society, Annual Meeting, San Diego, CA, October 29-November 2, 1994. (invited presentation)
- Swanson, C., R. Mager, J. J. Cech, Jr., and S. I. Doroshov (1994) Use of salts, anesthetics, and polymers to minimize transport and handling mortality in delta smelt (*Hypomesus transpacificus*). High Performance Fish, International Fish Physiology Symposium, Vancouver, BC, Canada, July 16-21, 1994.
- Swanson, C. K. Marine, and J. J. Cech, Jr. (1993) Effects of chronically elevated water temperature on thermal tolerance of chinook salmon smolts. American Society of Zoologists, Annual Meeting, Los Angeles, CA, December 26-30, 1993.
- Swanson, C. (1993) Physiological and behavioral responses to salinity by a euryhaline teleost, *Chanos chanos*. Symposium on Stress and Environmental Physiology of Fishes, American Fisheries Society, Annual Meeting, Portland, OR, August 28-September 3, 1993. (invited presentation)
- Swanson, C., J. J. Cech, Jr., and R. Piedrahita (1993) Use of mosquitofish for biological control of mosquitoes: balancing ecological costs and benefits. Western Society of Naturalists, Annual Meeting, Otter Rock, OR, January 7-10, 1993.

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